

What is claimed is:

1. A data generating device installed on an upstream side of a switching device for performing
5 switching based on data of a first layer, comprising:
 reading unit to read forward management information relating to a forwarding process of forward data from data of a second layer higher than the first layer;
10 storage unit to store the forward management information read by said reading unit;
 data generating unit to identify one or more clients, each of which corresponds to a forward destination of the forward data, on the basis of the
15 forward management information stored in said storage unit, and generating the same number of pieces of transmission data as the number of identified clients, wherein each of the pieces of transmission data includes equivalent contents to the forward data; and
20 forwarding unit to forward each piece of transmission data generated by said data generating unit to the switching device in order to transmit each piece of transmission data to each client corresponding to the forward destination.
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2. A data generating device according to claim 1, wherein said data generating unit determines one

or more clients, each of which corresponds to the forward destination, based on the data of the second layer in the forward data.

5 3. A data generating device according to claim 1, wherein said data generating unit generates the transmission data having an address of the client which is identified, as a destination address of the first layer of the transmission data.

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4. A data generating device comprising:

reading unit to read information relating to a forwarding process of multicast data from data of a layer higher than a layer 2 defined on OSI layer

15 model;

storage unit to store forward management information based on the information read by said reading unit; and

20 data generating unit to identify, based on the forward management information stored in the storage unit, one or more clients, each of which corresponds to a forward destination of the multicast data, and generating the same number of pieces of unicast data as the number of identified clients from the
25 multicast data, wherein each of the pieces of unicast data is transmitted to each of the identified clients.

5. A data generating device according to claim 4, wherein said data generating unit determines one or more clients, each of which corresponds to the forward destination, based on the data of the layer higher than the layer 2 in the multicast data.

6. A data generating device according to claim 4, wherein said data generating unit generates the unicast data having a MAC address of the client which is identified, as a MAC destination address.

7. A data generating device according to claim 4, further comprising sending unit to send each of pieces of the unicast data generated by said data generating unit and the multicast data toward a downstream side.

8. A data generating device according to claim 4, further comprising managing unit to update the forward management information stored in said storage unit on the basis of the information read by said reading unit.

9. A data generating device according to claim 8, wherein in case the information read by said reading unit is participation information indicating a participation in a multicast group, said managing

unit reflects contents of the participation information to the forward management information stored in said storage unit.

5 10. A data generating device according to claim
9, wherein in case the information read by the
reading unit is leaving information that indicates
leaving from the multicast group, the managing unit
deletes information relating to the client as a
10 sender of the leaving information from the forward
management information.

 11. A data generating device according to claim
9, further comprising time measuring unit to measure
15 a fixed period of time,

 wherein in case the time measuring unit judges
that a response to a response request is not received
for the fixed period of time or longer from the
client, the managing unit deletes information
20 relating to this client from the forward management
information.

 12. A data generating device according to claim
4, wherein said reading unit reads the information
25 from a message of Internet group management protocol
version 3.

13. A data generating device according to claim 4, wherein said reading unit reads the information from a message of multicast listener discovery version 2.

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14. A data generating device according to claim 4, wherein said managing unit, when a message of internet group management protocol version 1 or version 2 is received, changes the forward management information on the basis of specifications of the internet group management protocol version 1 or version 2.

15. A data generating device according to claim 4, wherein said storage unit stores the forward management information including correspondence between an address of the client to which multicast data should be forwarded and a destination address of the multicast data.

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16. A data generating device according to claim 15, wherein said storage unit stores the forward management information further including a source address of the multicast data.

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17. A data generating device according to claim 10, wherein said storage unit stores the forward

management information including correspondence
between an address of the client to which multicast
data should be forwarded and a destination address of
the multicast data, and the data generating device
5 further comprises client management information
storage unit to store client management information
based on the forward management information, wherein
the client management information include a client
identifier indicating the client to which the
10 multicast data should be forwarded, a destination
identifier indicating a transmission destination of
the multicast data, a time when relationship between
the client and the transmission destination of the
multicast data have been stored in the forward
15 management information, and a time when the
relationship have been deleted from the forward
management information.

18. A data generating device according to claim
20 10, wherein said storage unit stores the forward
management information including correspondence
between an address of the client to which the
multicast data should be forwarded, a destination
address of the multicast data and a source address of
25 the multicast data, and the data generating device
further comprises client management information
storage unit to store client management information

based on the forward management information, wherein the client management information include a client identifier indicating the client to which the multicast data should be forwarded, a destination
5 identifier indicating a transmission destination of the multicast data, a source identifier indicating a transmission source of the multicast data, a time when relationship between the client and the transmission destination of the multicast data have
10 been stored in the forward management information, and a time when the relationship have been deleted from the forward management information.

19. A data generating device comprising:
15 storage unit to store data relating to one or more clients desiring to receive multicast data to be forwarded based on a protocol of a first layer; and
data generating unit to generate, when accepts the multicast data, unicast data per client to be
20 forwarded based on a protocol of a second layer lower than the first layer, from the multicast data, on the basis of the data relating to the one or more clients that have been stored in said storage unit, and
giving the unicast data per client to sending unit to
25 send the unicast data toward one or more second layer switches accommodating the one or more clients.

20. A client management device comprising:
reading unit to read information relating to a
multicast data forwarding process;

storage unit to store forward management
5 information based on the information read by said
reading unit, wherein the forward management
information includes correspondence between an
address of a client to which multicast data should be
forwarded and a destination address of the multicast
10 data;

data generating unit to identify, based on the
forward management information stored in said storage
unit, one or more clients, each of which corresponds
to a forward destination of the multicast data, and
15 generating the same number of pieces of unicast data
as the number of identified clients , from the
multicast data;

managing unit to reflect, in case the
information read by said reading unit is
20 participation information indicating a participation
in a multicast group, contents of the participation
information to the forward management information
stored in said storage unit, and for deleting, in
case the information read by said reading unit is
25 leaving information that indicates leaving from the
multicast group, information relating to the client
as a sender of the leaving information from the

forward management information; and

client management information storage unit to
storing client management information based on the
forward management information, wherein the client
5 management information include a client identifier
indicating the client to which the multicast data
should be forwarded, a destination identifier
indicating a transmission destination of the
multicast data, a time when relationship between the
10 client and the transmission destination of the
multicast data have been stored in the forward
management information, and a time when the
relationship have been deleted from the forward
management information.

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21. A client management device comprising:

reading unit to read information relating to a
multicast forwarding process;

storage unit to store forward management
20 information based on the information read by said
reading unit, wherein the forward management
information include an address of a client to which
multicast data should be forwarded, a destination
address of the multicast data and a source address of
25 the multicast data;

data generating unit to identify, based on the
forward management information stored in said storage

unit, one or more clients, each of which corresponds to a forward destination of the multicast data, and generating the same number of pieces of unicast data as the number of identified clients from the
5 multicast data;

managing unit to reflect, in case the information read by the reading unit is participation information indicating a participation in a multicast group, contents of the participation information to
10 the forward management information stored on the storage unit, and for deleting, in case the information read by the reading unit is leaving information that indicates leaving from the multicast group, information relating to the client as a sender
15 of the leaving information from the forward management information; and

client management information storage unit to store client management information based on the forward management information, wherein the client
20 management information include a client identifier indicating the client to which the multicast data should be forwarded, a destination identifier indicating a transmission destination of the multicast data, a source identifier indicating a
25 transmission source of the multicast data, a time when relationship between the client and the transmission destination of the multicast data have

been stored in the forward management information,
and a time when the relationship have been deleted
from the forward management information.

- 5 22. A data generating method executed by an
information processing device installed on an
upstream side of a switching device for performing
switching based on data of a first layer, comprising:
 reading forward management information on a
10 forwarding process of forward data from data of a
second layer higher than the first layer;
 identifying one or more clients, each of which
corresponds to a forward destination of the forward
data on the basis of the forward management
15 information;
 generating the same number of pieces of
transmission data as the number of identified clients,
wherein each of the pieces of transmission data is
transmitted to each of the identified clients and
20 includes equivalent contents to the forward data; and
 forwarding each of the pieces of transmission
data to the switching device.

23. A data generating method comprising:
25 reading information relating to a forwarding
process of multicast data from data of a layer higher
than a layer 2 defined in OSI layer model;

storing forward management information based on
the readout information;

identifying, based on the stored forward
management information, one or more clients, each of
5 which corresponds to a forward destination of the
multicast data; and

generating, from the multicast data, the same
number of pieces of unicast data as the number of
identified clients.

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24. A client management method comprising:

reading information relating to a forwarding
process of multicast data;

storing forward management information based on
15 the readout information, wherein the forward
management information includes correspondence
between an address of a client to which the multicast
data should be forwarded and a destination address of
the multicast data;

20 identifying, based on the forward management
information, one or more clients, each of which
corresponds to a forward destination of the multicast
data;

generating, from the multicast data, the same
25 number of pieces of unicast data as the number of
identified clients;

reflecting, in case the readout information is

participation information indicating a participation in a multicast group, contents of the participation information to the stored forward management information;

5 deleting, in case the readout information is leaving information that indicates leaving from the multicast group, information relating to the client as a sender of the leaving information from the forward management information; and

10 storing client management information based on the forward management information, wherein the client management information include correspondence between a client identifier indicating the client to which the multicast data should be forwarded, a
15 destination identifier indicating a transmission destination of the multicast data, a time when relationship between the client and the transmission destination of the multicast data have been stored in the forward management information, and a time when
20 the relationship have been deleted from the forward management information.

25 25. A client management method comprising:
reading information relating to a forwarding process of multicast data;
storing forward management information based on the readout information, wherein the forward

management information include correspondence between
an address of a client to which the multicast data
should be forwarded, a destination address of the
multicast data and a source address of the multicast
5 data;

identifying, based on the forward management
information, one or more clients, each of which
corresponds to a forward destination of the multicast
data;

10 generating, , from the multicast data, the same
number of pieces of unicast data as the number of
identified clients;

reflecting, in case the readout information is
participation information indicating a participation
15 in a multicast group, contents of the participation
information to the forward management information;

deleting, in case the readout information is
leaving information that indicates leaving from the
multicast group, information relating to the client
20 as a sender of the leaving information from the
forward management information; and

storing client management information based on
the forward management information, wherein the
client management information include a client
25 identifier indicating the client to which the
multicast data should be forwarded, a destination
identifier indicating a transmission destination of

the multicast data, a source identifier indicating a
transmission source of the multicast data, a time
when relationship between the client and the
transmission destination of the multicast data have
5 been stored in the forward management information,
and a time when the relationship have been deleted
from the forward management information.